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The Buridan School Reassessed.
*John Buridan and Albert of Saxony**

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Introduction

Throughout the fifteenth and sixteenth centuries John Buridan enjoyed a reputation as a prominent master of arts at Paris. The manuscripts and early printed editions of his works were widely disseminated in all corners of Europe and became required reading at many universities, such as Vienna, Prague, Krakow, Rostock, and Saint Andrews.¹ But how was his impact among those who knew him personally, among those residing in Paris in the first half of the fourteenth century? Did Buridan have any close followers or students? As far as I am aware, there is no contemporary Parisian evidence to the effect that there existed a school of “Buridanists” in the same way as there were schools of Thomists or Scotists. Even so, one might ask whether there is some evidence to identify, in retrospect, a school of Buridan in fourteenth-century Paris.²

* This article is dedicated to Henk Braakhuis, *magister meus* in every possible sense of the word, on the occasion of his sixty-fifth birthday. Parts of this article formed the basis of lectures I gave in March 2000 at the Centre d'Études Supérieures de la Renaissance in Tours and in April 2002 at the Medieval Academy in New York. I thank Joel Biard and Gyula Klima for their kind invitations. I thank Paul Bakker, William Courtenay, Dirk-Jan Dekker, Jürgen Sarnowsky and Michiel Streijger for their helpful suggestions.

¹ B. Michael, *Johannes Buridan. Studien zu seinem Leben, seinen Werken und zur Rezeption seiner Theorien im Europa des späten Mittelalters*, 2 vols, Ph.D. dissertation Freie Universität Berlin, 1985, vol. 1, 239-398.

² At this point I should already mention that in 1551 a “Maison de Buridan” is attested among the schools of the Picard nation, and indicated on old maps. See note 15. Could this have been the house that Buridan left to the university at his death? See Michael 1985 (*op. cit.*, above, n. 1), vol. 1, 237, esp. n. 533 for an indication of the sources, which are all later than the fourteenth century. There also is some evidence from the fifteenth-century thinker Dominicus of Flandria (d. 1479), who mentions a view which is held by “Buridanists.” See Dominicus of Flandria, *Quaestiones super XII libros Metaphysicorum*, IV, q. 2, a. 5; ed. Venetiis 1523, reprinted Frankfurt am Main, 1967, fol. 16ra: “Alii vero sunt qui ponunt unum conceptum praecisum, qui tamen conceptus est unus unitate analogiae, et non unitate univocationis, sicut sunt *buridanistae*, qui ponunt quod conceptus entis, si accipitur secundum se, est univocus; si vero accipitur ex parte rei conceptibilis est analogus, praecisus tamen.”

If we take Pierre Duhem (1861-1916) as a starting point, this question seems to have been examined for nearly a century. Especially after Duhem's studies, the Buridan School at the University of Paris won everybody's admiration and was established as a historical fact. In brief, Duhem claimed that the accomplishments of seventeenth-century science, as exemplified in Galilei and Descartes, had in essence already been achieved in the fourteenth century at the faculty of arts in Paris, and particularly, by the school of John Buridan.³ With respect to this school, Duhem offered the following observations in his *Système du monde*:

Les enseignements [de Buridan] furent très fidèlement reçus et développés par des maîtres éminents, par Albert de Helmstoedt, surnommé Albert de Saxe, par Témon le fils du Juif, par Nicole Oresme, par Jean Marsile d'Inghen. La faculté des Arts de Paris fut ainsi, pendant une demi-siècle, l'École de Buridan.⁴

And again:

Après Buridan et Albert de Saxe, la Scolastique ne trouve plus rien de nouveau à dire sur la nature du mouvement; comme il advient presque toujours, la lecture des oeuvres de Marsile d'Inghen nous annonce le déclin de l'École de Paris.⁵

Nowadays, historians of science agree that Duhem's vision of the Buridan school as an anticipation of seventeenth-century natural philosophy is wrong. Yet, this has not diminished in any way the high esteem for the Buridan school. Even severe critics of Duhem, such as Anneliese Maier and Marshall Clagett, have emphasized that the school of Buridan was one of the two most prominent schools of medieval natural philosophy (the other being the school of Thomas Bradwardine (d. 1349) at Merton College in Oxford, also known as the Oxford Calculators). According to Maier, the precise teacher-student relations between the members of the Buridan school were unknown, although the school was clearly characterized by "its unitary teaching tradition and its intellectual physiognomy."⁶ Even though Maier was more cautious than Duhem, the picture that thus emerged was that of the Buridan school as a coherent inner circle of students and followers, with John Buridan himself at its center. The existence of a Buridan school in fourteenth-century Paris has been

³ Pierre Duhem, *Le système du monde. Histoire des doctrines cosmologiques de Platon à Copernic*, Paris, 1914-1958, vol. 6, 697 and also vol. 8, 200, 215-6, and 225. I am not suggesting that the notion of a Buridan school originated with the studies by Duhem.

⁴ Duhem 1914-1958 (*op. cit.*, above, n. 3), vol. 6, 698.

⁵ Duhem 1914-1958 (*op. cit.*, above, n. 3), vol. 4, 361.

⁶ Anneliese Maier, *Die Vorläufer Galileis im 14. Jahrhundert*, Roma 1949, 3.

repeated in many subsequent publications, if sometimes only as a label of convenience.⁷

Since the time of Duhem, much further knowledge of Buridan's thought, of that of his alleged followers, and of the intellectual and institutional aspects of university life in fourteenth-century Paris has accumulated.⁸ In addition, some crucial texts have become available in critical editions, or are in the course of completion. All this material, brought together by many scholars, provides an invitation to draw together some threads and to offer a new interpretation of the so-called Buridan school.

A portrait of the Buridan school

In order to set the stage for this study, I would like to recall briefly some striking biographical details of the members of the Buridan school. It has been portrayed to consist of the following five thinkers: John Buridan (d. ca. 1360), Albert of Saxony (d. 1390), Nicole Oresme (ca. 1320-1382), Themon Judeus (flor. 1349-1360), and Marsilius of Inghen (ca. 1330-1396).⁹

John Buridan originated from the diocese of Arras, and hence, belonged to the Picard nation. He twice served as rector of the university. We do not know under which master Buridan took his degree, but it certainly was not Ockham, as the seventeenth-century historian Du Boulay claimed in his *Histoire de l'université de Paris*. John Buridan was the most prolific Aristotle commentator of the group, if not of the entire fourteenth century. He made major contributions to logic, physics, metaphysics, and ethics.

⁷ Some scholars have expressed caution. See, for instance, Michael 1985 (*op. cit.*, above, n. 1), vol. 1, 281-2, and most recently Michael J. Fitzgerald, *Albert of Saxony's Twenty-Five Disputed Questions on Logic. A Critical Edition of His Quaestiones circa Logicam*, Leiden-Boston-Köln 2002, 1-14, who takes issue with the view that Albert of Saxony was a pupil of Buridan.

⁸ For a survey of the literature see J.M.M.H. Thijssen, *Late Medieval Natural Philosophy. Some Recent Trends in Scholarship*, in: *Recherches de Philosophie et Théologie Médiévales*, 67 (2000), 158-90, esp. 177-85, and 188 for a first sketch of the problematic concept of a coherent "Buridan school."

⁹ For the biographical information, I have relied on the following studies: Michael 1985 (*op. cit.*, above, n. 1), esp. vol. 1, 79-238; Jürgen Sarnowsky, *Die aristotelisch-scholastische Theorie der Bewegung. Studien zum Kommentar Alberts von Sachsen zur Physik des Aristoteles*, Münster 1989, esp. 11-54; Stefan Kirschner, *Nicolaus Oresmes Kommentar zur Physik des Aristoteles*, Stuttgart 1997, esp. 15-37; Henri Hugonnard-Roche, *L'œuvre astronomique de Thémon Juif, maître parisien du XIV^e siècle*, Genève-Paris 1973; Marsilius von Inghen, *Quaestiones super quattuor libros Sententiarum. Bd. I. Super primum, Quaestiones 1-7*; bearbeitet von Manuel Santos Noya, Leiden-Köln-Boston 2000, esp. pp. xvii-xxvi.

Albert of Saxony is probably best known as the founder of the University of Vienna in 1364. Before his involvement with this new university, however, he enjoyed a distinguished career in Paris. He took his degrees in the arts faculty in Paris in 1351, under master Albert of Bohemia. Before he arrived in Paris, he probably studied in Erfurt. Originating from the region of Helmstedt, he belonged to the English-German nation. Several times, he fulfilled offices at this nation. In 1353 he started studying theology, but probably never took his degree. From 1366/67 until his death on July 8, 1390, he was Bishop of Halberstadt. Albert too wrote many commentaries. Especially his commentaries on *De caelo* and the *Physics* were influential and survive in many copies.

Nicole Oresme was born in the vicinity of Caen. His name first appears in university records in 1346, as a student of theology at the Collège de Navarre. From a papal letter that was recently rediscovered, we now know that in 1342, he already was a master of arts.¹⁰ In 1356, Oresme became rector of the Collège de Navarre, which means that he must have had his doctorate in theology by then. In 1377, he was nominated Bishop of Lisieux. He died on July 11, 1382. Oresme is well known for his French translations of some of Aristotle's treatises. He also wrote Latin commentaries on *De anima*, *De caelo*, *De generatione et corruptione*, *Metheora*, and the *Physics*. Besides the fact that he belonged to the Norman nation, not much is known of Oresme's career at the arts faculty.

Themon Judeus originated from Münster in Westphalia, and, as a consequence, belonged to the English-German nation. Like Albert, he too had a distinguished career as an officer of this nation. Between 1349 and 1353 he was absent from Paris, probably because of the Plague, as Henri Hugonnard-Roche conjectured. During this period Themon taught in Erfurt at the school of the Scotch Benedictine Abbey of St. Jacob, one of the so-called German *Schottenklöster*. Note that Albert of Saxony also stayed in Erfurt during that period. It is unknown whether they knew each other from Erfurt, but they certainly must have known each other from the English-German nation. In 1361 Albert succeeded Themon as receptor of that nation. Themon wrote a commentary on Aristotle's *Metheora*. His other works are treatises on astronomy.¹¹

¹⁰ See William J. Courtenay, *The Early Career of Nicole Oresme*, in: *Isis*, 91 (2000), 542-8.

¹¹ It has now been established that Themon died in 1361. See William J. Courtenay and Eric D. Goddard, *Rotuli Parisienses: Supplications to the Pope From the University of Paris*, vol. II: 1352-1378, Leiden-Köln-Boston 2004, 5.

Marsilius of Inghen was born near the city of Nijmegen. He is first mentioned in the records in 1362, when he took his degree in arts at Paris under his Dutch countryman William Buser of Heusden. Like Albert and Themon, he belonged to the English-German nation, in which he held many administrative offices. He was rector twice (1367; 1371), and university delegate at the papal court. In 1366 he started to study theology in Paris, but only took his degree in 1395/96 in Heidelberg. His transference to Germany was connected with his involvement with the foundation of the new university of Heidelberg (1386). Most influential among the many Aristotle commentaries he wrote, was the one on *De generatione et corruptione*.

If one reviews the biographies of these five masters, several details are striking. With the exception of Themon, they all commented on many works by Aristotle, some of them even several times on the same work. All of them were secular masters at the arts faculty in Paris. However, they belonged to different nations. All of them held important administrative offices for their respective nation. Two of them, Albert of Saxony, and Marsilius of Inghen, became even involved in the foundation of new universities, namely Vienna and Heidelberg. With the exception of John Buridan, they all at some point in their career, moved on to theology. Two of them, Albert of Saxony and Nicole Oresme, eventually became bishops. In brief, they all were prominent personalities, both in intellectual affairs as in matters of government and administration.

In my attempt to seek new perspectives on the Buridan school, I have been following two, rather obvious, lines of inquiry. The first approach is institutional. The second line of inquiry is doctrinal. Both hark back on medieval notions of “school” that are still used in contemporary historiography.¹²

The Buridan School: the Institutional Perspective

The basic medieval meaning of “school” was that of the classroom where the teaching took place. The city of Paris hosted many such schools, located in specific areas. They were the venues of medieval intellectual life. What role did specific locations have in the making of late-medieval (natural) philosophy? Or, in other words, how probable is it that Albert

¹² William J. Courtenay, *Schools and Scholars in Fourteenth-Century England*, Princeton, NJ 1987, 171-5 and Olga Weijers, *Terminologie des universités au XIII^e siècle*, Roma 1987, 43-5.

of Saxony, Nicole Oresme, Themon Judeus and Marsilius of Inghen were students in Buridan's school, as has been assumed in much of the scholarly literature? Do occasional references to "my master" in the works of some of these authors, if they apply to Buridan at all, have a deeper significance, or are they standard forms of courtesy to address (senior) colleagues?¹³

The faculty of arts in Paris was the combination of four smaller units, the French, Picard, Norman and English-German nations. Geographical origin determined to which nation a master or student would belong. Together, the nations acted as the faculty of arts, presided over by the rector. In addition to their common duties, such as the conferment of degrees and the establishment of the curriculum, the nations exercised activities as separate corporate components. Each nation had its own officers, revenues, treasury, seal, patron saints, and authority to regulate its own members. The head of the nation was the proctor. Among other things, he summoned the assemblies of the members of his nation and presided over their meetings.

Since teaching was organised by nation, the question which I needed to investigate was, whether the "Norman" Oresme, and the "Anglo-Germans" Albert of Saxony, Themon Judeus, and Marsilius of Inghen could possibly have been students of the "Picard" John Buridan.¹⁴ This lead question raised other questions such as how the schools of the nations were organised, and which students they recruited. Probably due to the poverty of the sources, surprisingly little has been written on these aspects of university history. In what follows, I shall present both well-known and less widely known aspects of the schools of the nations in Paris.¹⁵

¹³ Courtenay 1987 (*op. cit.*, above, n. 12), 191 has drawn attention to this dimension of the epithet "my (reverend) master." In the *Quaestiones super libros De generatione et corruptione*, ed. Venice 1501 (photomechanical reprint Frankfurt a.M., 1970), fol. 106va, Marsilius of Inghen refers to Buridan in this way: "Et quia hec opinio mihi probabilis apparet, nescio si passionatus ex opinione magistri mei magistri Johanni Bridan qui eam posuit, ideo eam in suis partibus persuadere propono et eam immediate declarare intendo." According to Benoît Patar, *La physique de Bruges de Buridan et le traité du ciel d'Albert de Saxe*, 2 vols, Longueuil (Québec) 2001, vol. 1, 507*-8* three such references in Albert of Saxony's *Quaestiones super libros De caelo* should also be read as references to John Buridan. Patar considers the courtesy titles as proof that Albert of Saxony was a pupil of Buridan.

¹⁴ Note that, for reasons of chronology, it may have been impossible that Marsilius of Inghen ever personally met John Buridan, since the latter may already have been dead when Marsilius came to Paris.

¹⁵ What follows is heavily indebted to the following publications: *Auctarium Chartularii Universitatis Parisiensis*, ed. Henri Denifle and Émile Chatelain, Paris 1894, vol. 1, pp. xxvi-xxxiii; Adolphe Bert, *Topographie historique du vieux Paris*, 5 vols, Paris 1866-1897, esp. vol. 5

From the minutes of the meetings held by the English-German nation as recorded in its proctors' book (*liber procuratorum*), it appears that many of the nation's expenses went to the purchase, upkeep, and repair of the schools. On the basis of these records, it is even possible to reconstruct more or less accurately the location of the nations' several schools in the Rue de Fouarre. The schools of the French nation were adjacent to those of the Normans, which in their turn were next to those of the Picards and the English-German nation. On the opposite side of the street were additional schools of the Picards and of the English-German nation. At times, the nations would even share a building.¹⁶ As from the second half of the fourteenth century (1358), the Rue de Fouarre was closed off at night by wooden barriers. They served to prevent the deposit of litter in the streets, about which the masters had bitterly complained. Although according to regulations from the early fourteenth century, it was forbidden to set up schools outside of the Rue de Fouarre, in the latter half of that century, the nations had to seek other locations for schools, in order to accommodate the increasing number of students and masters.

In any case, it is clear that each of the nations rented, owned and maintained buildings which they distributed among their masters for the purpose of teaching. From the French and Picard nations we have records about how the schools were assigned to their masters. Only the regent masters, that is, those masters who were actively teaching (not just residing) during the Grand Ordinary, a defined period of time which ran from October 1 until Easter, were entitled to have a school assigned to them. By 1371, under the rectorship of Marsilius of Inghen, the old custom was abolished under which masters were to retain the schools they had used in the previous year. Instead, the schools were now distributed among the regent masters each year between the feast of Bartholomew (August, 24) and Saint Remigius (October, 1), the beginning of the academic year.

One of the major duties of any master, of course, was to supervise the study of his students. But where did these students come from? Thanks to a prosopographical study by Mineo Tanaka it is possible to give an impression of the geographical origins of the student population of the

(Région centrale de l'université), which includes a map, showing the locations of the different schools; Gray C. Boyce, *The English-German Nation in the University of Paris during the Middle Ages*, Bruges 1927, 113-49; Pearl Kibre, *The Nations in the Mediaeval Universities*, Cambridge, Mass. 1948, 82-97.

¹⁶ In 1393 Picards occupied the upper story of schools owned by the English-Germans. Controversy arose over the maintenance of the building.

English-German nation.¹⁷ Tanaka was interested in studying the relations between students and masters. To this purpose, he investigated which students took a degree under which master. He focused on the three major stages in the academic career: the determination (*determinatio*), the license (*licentia*), and the inception (*inceptio*).¹⁸ Tanaka was mainly interested in the patterns that occurred in the supervision of the academic study, for instance in the number of students who took all three degrees under the same master, or who switched to another supervisor after the determination, or after the license. His prosopographic study makes one point abundantly clear. Students took their degrees with masters of their own nation.¹⁹ More in particular, they seemed to seek out masters from their own region.²⁰ Occasionally, it did happen that a candidate obtained his license under a master from another nation. However, this practice was due to the fixed number of bachelors that each nation was allowed to examine for the license each month.²¹ The proctor's book of the English-German nation singles out the candidates who took their license under a master of another nation with an epithet. They are called *normanizatus*, *picardizatus*, or *gallicatus*, but they remained members of the English-German nation.²²

The nations did not take lightly their prerogative over the academic degrees. Two bitter disputes about the boundaries of the nations were precipitated by controversies over the inception of candidates. In 1266, Jean de Ulliaco, resident of a diocese of Beauvais, and hence belonging

¹⁷ Mineo Tanaka, *La nation anglo-allemande de l'Université de Paris à la fin du Moyen Age*, Paris, 1990.

¹⁸ Note that only regent masters were allowed to supervise the determination. This is not true for the other two exams.

¹⁹ Tanaka 1990 (*op. cit.*, above, n. 17), 156-85.

²⁰ The results of Tanaka's study coincide with the results of a geographical analysis of the Paris academic community carried out by William Courtenay, on the basis of different source material and to a different purpose. He too concluded that, for instance, the lodging of the academic community was according to regional or linguistic ties. See William J. Courtenay, *Parisian Scholars in the Early Fourteenth Century. A Social Portrait*, Cambridge 1999, 81-91.

²¹ "On March 16, 1338, the faculty ruled that of the sixteen scholars who would be examined for the license in arts at Ste. Geneviève each month, six were to be from the French nation, four each from the Norman and Picard nations, and two from the English-German nation, of which half would be examined at each audition." See Kibre 1948 (*op. cit.*, above, n. 15), 101, and *Chartularium Universitatis Parisiensis*, ed. Henri Denifle and Émile Chatelain, 4 vols, Paris 1889-97, vol. 2, 474.

²² Tanaka 1990 (*op. cit.*, above, n. 17), 153-4.

to the Picard nation, wished to incept in the French nation. The Picards, however, not only claimed him, but seized him bodily.²³

More interesting for our purpose is another conflict, which arose in 1356, and which involved some of the main characters of the Buridan school. In that year, a certain John Mast passed through the Rue du Fouarre with the beadles of the Picard nation to seek the permission from the masters of arts to incept, as was the custom.²⁴ Master Themon Judeus from the English-German nation, however, refused his approval. He pointed out that John Mast had already determined in the English-German nation.²⁵ The earlier dispute between the two nations over Mast's degrees still had not been resolved. For this reason, he had to refrain from attaching himself to either nation. The ensuing discussions between the two nations, which dragged on until the end of 1358, are well documented. The conclusion of the debate was that the English-Germans and the Picards settled on the river Meuse in the Low countries as the boundary between their two nations. The geographical and linguistic ramifications of the debate need not concern us here. What is interesting is, that John Buridan presented the case of the Picards before the committee of deputies which had to decide the dispute;²⁶ that Themon Judeus substituted the absent proctor of the English-German nation, and that among those masters who signed the final agreement were not only John Buridan, but also Albert of Saxony. As usual, the meeting was rounded off in a tavern. After the treaty was signed, the masters celebrated in a pub called "At the grange" (*Ad grangiam*). Part of the bill was paid by a master William Buser of Heusden, who not only happened to be a local from the contested region, but who also was the master under whom Marsilius

²³ *Chartularium Universitatis Parisiensis*, vol. 1, nr. 409.

²⁴ See Gray C. Boyce, *The Controversy over the Boundary Between the English-German and Picard Nations in the University of Paris (1356-1358)*, in: H. Vander Linden e.a. (eds), *Études d'Histoire dédiées à la mémoire de Henri Pirenne*, Bruxelles 1937, 55-66 for an analysis of the incident and a discussion of the sources.

²⁵ *Auctarium Chartularii Universitatis Parisiensis*, vol. 1, 206: "Item 19a die ejusdem mensis facta erat congregacio apud Sanctum Julianum pauperum super quodam bacalario, nomine Johannis Mast, Leodiensis dyoc., qui dum incipere volebat et transisset cum bedellis nacionis Pycardie per vicum Straminis ad petendum licenciam a magistris facultatis artium, ut morum est, si inceptio sua in dicta facultate eis placeret, respondit magister Themo Judeus nacionis Anglicane, quod non, eo quod alias determinans fuit in sua nacione, et super hoc orta fuisset lis inter magistros nacionis Pycardie et nacionis Anglicane predictarum, ex eo quod quelibet nacio cum dicebat pertinere ad suam nacionem, et super hoc discussum fuisset in facultate predicta, quod nec magis se tenere debet ad unam nacionem quam ad aliam . . ."

²⁶ *Auctarium Chartularii Universitatis Parisiensis*, vol. 1, 212-8.

of Inghen would incept four years later.²⁷ At the basis of the dispute over the nations' boundaries were financial concerns. The students had to pay a fee to the nation for their exams, and it was this financial dimension which caused the commotion.

The episode illustrates, I believe, that it is highly questionable to view Albert of Saxony, Nicole Oresme and Themon Judeus as students at the schools of the Picard John Buridan. As mentioned above, in the cases of Albert of Saxony and Marsilius of Inghen, it is even attested that they took their degrees with master Albert of Bohemia and William Buser, respectively, who came from the same regions as their graduates. On the basis of the above evidence from university sources, the most immediate task in Buridan research lies, I think, in untangling the doctrinal affiliations that are reflected in the writings by Buridan himself and in those by his alleged followers.

The Buridan school: the doctrinal perspective

With respect to examining Buridan's doctrinal following in fourteenth-century Paris, I will limit my attention to his commentaries on the *Physics*, and relate them to the commentary by Albert of Saxony. This choice seems natural for several reasons. First, Buridan's *Quaestiones* on the *Physics* stood at the heart of the entire concept of a Buridan school. Moreover, there are a few indications in the scholarly literature, about which more below, that Albert used Buridan's *Physics*. And finally, we can now benefit from the edition of Albert of Saxony's *Quaestiones* on the *Physics* by Benoît Patar and the nearly completed edition of one of Buridan's texts.²⁸

If we want to understand the impact of Buridan's *Physics* upon Albert of Saxony, we must remember briefly some facts about its transmission. At present two long versions of *Quaestiones* on the *Physics* are being attributed to John Buridan. One has been handed down in four manuscripts and is sometimes referred to as the *tertia lectura*.²⁹ The other version has

²⁷ *Auctarium Chartularii Universitatis Parisiensis*, vol. 1, 233-6.

²⁸ Albert of Saxony's *Physics* has been edited in Benoît Patar, *Expositio et Quaestiones in Aristotelis Physicam ad Albertum de Saxonia attributae. Édition critique*, 3 vols, Louvain-Paris 1999. A critical edition of John Buridan's *Quaestiones super octo libros Physicorum, secundum ultimam lecturam* is being prepared by a team of editors, including Dirk-Jan Dekker, Olaf Pluta, Michiel Streijger and the present author, at the Center for Medieval and Renaissance Natural Philosophy at Nijmegen University.

²⁹ This implies that there should be two other, earlier versions of Buridan's *Quaestiones* on the *Physics*. If they exist at all, they have not been identified yet.

been preserved in 31 manuscripts and one printed edition from 1509.³⁰ In the surviving testimonies, it is commonly labeled as the *ultima lectura*. The *tertia lectura* seems to precede the *ultima lectura*. The latter is longer, in that there are more *quaestiones*, but also more elaborate arguments and a more polished style. There seem to be few, if any, doctrinal divergences between the two versions.³¹ In the short preface to the *Quaestiones super octo libros Physicorum Aristotelis, secundum ultimam lecturam*, as the full title usually runs, this text is introduced as Buridan's authorized version.³²

Albert of Saxony's *Quaestiones super octo libros Physicorum Aristotelis* have been handed down in 18 manuscripts and at least five printed editions.³³ On the basis of the attributions in the manuscripts, I think that there is no reason whatsoever to doubt the authenticity of this work: it is a genuine text by Albert of Saxony. This observation may seem redundant, were it not that Benoît Patar, the editor of the *Quaestiones super octo libros Physicorum Aristotelis*, has rejected Albert's authorship. He believes that this text is a *prima lectura* by John Buridan, and consequently refers to Buridan's *tertia lectura* as the *secunda lectura*.³⁴ In addition, it seems that the first five

³⁰ See Dirk-Jan Dekker, *De tijdfilosofie van Johannes Buridanus* († ca. 1360), Ph.D. thesis, University of Nijmegen, 2003, 99-103.

³¹ The titles of the *quaestiones* of the *ultima lectura* are given in J.M.M.H. Thijssen, *The Short Redaction of Buridan's Questions on the Physics and their Relation to the Questions on the Physics attributed to Marsilius of Inghen*, in: Archives d'histoire doctrinale et littéraire du moyen-âge, 52 (1986), 237-66, esp. 240-5. Those of the *tertia lectura* are provided in M. Markowski, *Les Quaestiones super I-VIII libros Physicorum Aristotelis de Nicolas Oresme retrouvées?*, in: Mediaevalia Philosophica Polonorum, 26 (1982), 19-41, esp. 37-41. See now also Benoît Patar 2001 (*op. cit.*, above, n. 13), vol. 2, 350-419, for a comparison of the titles. A. Maier, *Zwei Grundprobleme der scholastischen Naturphilosophie. Das Problem der intensiven Größe, die Impetustheorie*, Roma 1968, 370-8 compared both versions with respect to the impetus theory. J.M.M.H. Thijssen, *Johannes Buridanus over het oneindige. Een onderzoek naar zijn theorie over het oneindige in het kader van zijn wetenschaps- en natuurfilosofie*, 2 vols, Nijmegen 1988, vol. 1, 7-71 compared both versions with respect to Buridan's theory of the infinite.

³² Approximately half of the manuscripts offer the following preface: "Bonum, ut habetur primo *Ethicorum*, quanto est multis communius, tanto est melius et divinius. Propter quod multorum de discipulis seu scholaribus meis precibus inclinatus ego aliqua scribere praesumpsi de difficultatibus libri primi *Physicorum* Aristotelis, et hanc illis scripturam communicare, quia non possent—ut dicunt—multa in scholis audita sine alicuius scripturae adiutorio memoriae commendare. Super quibus ego peto et supplico de omissis et minus bene dictis obtinere veniam, de inventis autem si quae fuerint convenientia multas habere grates et bonorum scholarium orationes." See Dekker 2003 (*op. cit.*, above, n. 30), 11 and 102.

³³ Sarnowsky 1989 (*op. cit.*, above, n. 9), 439-40, and 450, and Patar 1999 (*op. cit.*, above, n. 28), 38*-59*.

³⁴ I cannot go into the arguments here, but let the following quotation, which seems to capture Patar's point of departure, speak for itself. Benoît Patar 2001 (*op. cit.*, above, n. 13), vol. 2, 399*: "Il faut donc affirmer dès maintenant avec force que la *Physique* du manuscrit 477 n'est pas et ne peut pas être d'Albert de Saxe, quand bien même tous les

books of a later version of Albert's *Quaestiones* have been preserved in one manuscript.³⁵ It has not been studied here.

For the present comparison of Albert's and Buridan's *Physics*, I have singled out two case-studies. The first concerns the problem of quantity or spatial extension, whereas the second one concerns Buridan's theory of impetus. I was led to this choice by a suggestion first made in Jürgen Sarnowsky's fundamental study of Albert of Saxony's *Physics*. Its implications for the whole idea of a Buridan school, however, were, to my knowledge, never further explored. Sarnowsky's thesis, for which I will provide some additional evidence, is that Albert of Saxony's *Quaestiones* on the *Physics* need to be placed between Buridan's *tertia lectura* and his *ultima lectura*. Albert knew Buridan's *tertia lectura* of the *Physics* and responded to it. Buridan in his *ultima lectura*, in turn, responded to Albert of Saxony's *Quaestiones* on the *Physics*.³⁶

Substance and Quantity

In general, medieval thinkers believed that spatial extension belonged in the category of quantity, and that some substances, such as bodies, have extension as their most important feature. However, not only the substance of body, but also many of its qualities were considered to be extended. The dimensions of Socrates' whiteness, for instance, were believed to coincide with Socrates himself, that is, with substance. But is it really accurate to equate quantity with substance and quality, respectively, or

colophons de tous les manuscrits et de tous les incunables de la planète le lui attribueraient. Il faut au contraire soutenir qu'il s'agit de la première oeuvre connue que Buridan a consacré à la *Physique*." The manuscript Bruges 477 preserves an anonymous copy of the text that in other manuscripts is attributed to Albert of Saxony. None of the known manuscripts attributes this text to John Buridan.

³⁵ The later redaction has been preserved in the manuscript London, Welcome Medical Historical Library, L 15, fols. 1ra-99vb. Books 6-8 in this manuscript coincide with Albert's usual text. Both versions are studied in Sarnowsky 1989 (*op. cit.*, above, n. 9), 451-60, and further compared in Jürgen Sarnowski, *Place and Space in Albert of Saxony's Commentaries on the Physics*, in: *Arabic Sciences and Philosophy*, 9 (1999), 25-45. Most recently, Sarnowsky has established that yet another commentary on the *Physics* attributed to Albert of Saxony, was actually composed by Theodoric of Erfurt. See *Ein Albert von Sachsen zugeschriebener Physikkommentar aus der Mitte des 14. Jahrhunderts*, in: *Medioevo*, 27 (2002), 449-74.

³⁶ Sarnowsky 1989 (*op. cit.*, above, n. 9), 50-1, and 58-9. Note that editions of the relevant texts are available in vol. 2 of Patar 2001 (*op. cit.*, above, n. 13), vol. 2. Patar edited these and other fragments as part of his, as I believe, failed attempt to prove that Buridan actually is the author of the text generally attributed to Albert of Saxony. For the sake of convenience, I will refer to Patar's edition of the passages that are quoted here.

should quantity be considered a separate entity? Originally, this ontological question arose in the theological context of Christ's quantity in the Eucharist, but it came to be developed into a genuine philosophical doctrine.³⁷ In addition to theoretical arguments (either of a theological or a philosophical nature), also arguments from experience played a role in the debate. The most important of these is the argument from condensation and rarefaction. Briefly stated, the phenomenon of condensation and rarefaction seemed to teach that the extension or quantity of a given substance can vary, whereas the "amount" of substance and its quality remain constant: no new parts of substance are added, nor any destroyed (in contrast to the phenomena of growth and diminution). This experience was taken as a proof that extension and quantity were really distinct from substance and its qualities. It was the extension inhering in substance that was corrupted and generated in the process of condensation and rarefaction, not the substance itself. William Ockham, on the other hand, argued that the condensation and rarefaction of substances is caused by the local motion of the parts of substance. In condensation and rarefaction, the parts come spatially closer together or more distant from each other, respectively, than they were before.³⁸

Already Anneliese Maier had noticed that John Buridan and Albert of Saxony held divergent opinions on the issue of the ontological status of quantity. Buridan argues that quantity, or more accurately, magnitude (*magnitudo*), and substance are really distinct.³⁹ Albert of Saxony, on the other hand, denies that substance and quantity are really distinct. According to Maier, Albert of Saxony in his commentary on the *Physics* seemed to respond to two arguments of Buridan.⁴⁰ She did, however, not include Buridan's *tertia lectura* in the comparison, and did not further develop the implications of her insights for the chronology of these works or for the

³⁷ The most recent large-scale study devoted to the theological ramifications of the debate about quantity is P.J.J.M. Bakker, *La raison et le miracle. Les doctrines eucharistiques (c. 1250-c. 1400)*, 2 vols., Nijmegen 1999, esp. vol. 1, 120-55.

³⁸ Ockham's views are discussed in Anneliese Maier, *Metaphysische Hintergründe der spätscholastischen Naturphilosophie*, Roma 1955, 192-3 and Marilyn McCord Adams, *William Ockham: Voluntarist or Naturalist?*, 2 vols., Notre Dame 1987, vol. 1, 178-84.

³⁹ Buridan in his discussion of this ontological problem consistently refers to magnitude, rather than quantity. His terminology is actually more precise, since the debate was about those quantities that are continuous, i.e., magnitudes (defined as a *quantitas continua permanens*), and not about those that are discrete. See also Maier 1955 (*op. cit.*, above, n. 38), 210 for this point.

⁴⁰ Maier 1955 (*op. cit.*, above, n. 38), 219-21. Buridan's views are discussed on pp. 210-8.

relationship between Buridan and Albert of Saxony. Nevertheless, her doctrinal observations, and those by Jürgen Sarnowsky and Joël Biard, who also studied this debate, provide an excellent context to reveal the relationship between Buridan's and Albert's commentaries on the *Physics*.⁴¹

The intricacies of the different arguments pro and con need not concern us here. What I would like to focus on, are the two arguments in Buridan's text to which Albert seems to respond. They both hinge on an interpretation of the phenomenon of condensation and rarefaction. Even though medieval authors frequently referred to condensation and rarefaction when seeking support for their own view of substance and quantity, these two particular arguments did not appear in the debate prior to Buridan and Albert of Saxony.⁴²

In the *tertia lectura* of his *Quaestiones* on the *Physics*, right at the beginning of his own solution (*determinatio*), Buridan develops an argument from condensation and rarefaction that involves an elaborate experiment. The argument is expressly directed against those who claim that substance and quantity coincide, and who attribute condensation and rarefaction to local motion, which causes the parts of substance to be more distant or closer together from one another, without the addition or corruption of quantity.

Ad istam quaestionem respondeo secundum viam antiquam quod nulla substantia est magnitudo sive quod materia non est magnitudo. Et ad hoc adduco primo unam rationem naturalem: ponentes enim quod omnis res extensa sit magnitudo concedunt rarefactionem et condensationem fieri per motum localem secundum quem partes substantiae elongantur ab invicem vel approximantur ad invicem ad obtinendum minorem locum absque hoc quod quantitas corrumpatur.⁴³

Against this view, Buridan presents a counter-example, derived from experience. If one opened a pair of bellows (*vesica*) to fill them with air [and then plugged the opening], "you would be unable to noticeably condense the air in the bellows by compression, such that it would noticeably obtain

⁴¹ Sarnowsky 1989 (*op. cit.*, above, n. 9), 92, and Joël Biard, *Conception sémiologique de la science et statut ontologique de la quantité dans le nominalisme parisien du XIV^e siècle*, in: G. Federici Vescovini and Fr. Barocelli (eds), *Filosofia, scienza e astrologia nel Trecento europeo*, Padova 1992, 135-54, esp. 150-3, and Joel Biard, *De la logique à la physique: quantité et mouvement selon Albert de Saxe*, in: *Les Études philosophiques*, 3 (1996), 361-74, esp. 366-7. Patar 2001 (*op. cit.*, above, n. 13), vol. 1, 355* wrongly believes that Albert's and Buridan's texts are about different doctrinal issues, and that their views are compatible.

⁴² I am basing myself on the material in Maier 1955 (*op. cit.*, above, n. 38), 141-223. Among the authors who, in this context, refer to condensation and rarefaction, are Richard of Mediavilla, William Ockham, and Francis de Marchia.

⁴³ John Buridan, *tertia lectura*, in: Patar 2001 (*op. cit.*, above, n. 13), vol. 2, 21, 1.75-82.

a smaller space.” Buridan wonders why this is so. According to him, neither the air’s matter, nor its substantial form, nor its quality are the obstacle.⁴⁴ Consequently, another disposition of the air resists the efforts to condense its parts closer together in the bellows, and this is the air’s “magnitude”: “et illa non erit aliud quam magnitudo.” In other words, on the basis of this experiment, Buridan concludes that magnitude, i.e., quantity, is distinct from the air’s matter, form or quality.

Tunc pono quod vesica impleatur aere: manifestum est quod tu per compressionem non poteris illum aerem notabiliter condensare ita quod notabiliter obtineat minorem locum; et tamen tu bene habes potestatem movendi ipsum localiter. Peto ergo quid prohibet et quid resistit quod tu non potes ipsum ponere in minorem locum. Constat quod materia non resistit, quia multo plus de materia posset in minore loco; nec forma aeris resistit, quia per alterationem experimur aerem, salvata forma sua, posse condensari et rarefieri ad duplum. Quod sic potest experiri. Capiamus fiolam vitream et calefaciamus eam super carbones, postea ponamus os fiolae in aqua; videbimus quod, quando aer in fiola inclusus refrigerabitur, quod in tantum condensabitur quod oportebit aquam ascendere in fiola et replere medietatem fiolae ne remaneat vacuum; ergo ex forma aeris non repugnabat quin tu posses illum aerem comprimendo condensare. Sed nec etiam repugnabat ex parte caliditatis vel frigiditatis, quia multo plus de caliditate vel etiam de frigiditate posset in minore loco. Ergo praeter hoc erit ibi alia dispositio hoc prohibens et illa non erat aliud quam magnitudo, de cuius natura est facere distare: tunc enim non poteris illam corrumpere per suam compressionem, sed natura per huiusmodi actionem poterat condensare et rarefacere et non tu per compressionem.⁴⁵

Buridan proves the same point by another argument from condensation and rarefaction, which follows right after the experiment with the bellows. Suppose that God would condense or rarefy a lump (*globus*) of air which includes everything. The condensation or rarefaction would entail a change or motion from one disposition into another one. Hence, in addition to the substance of air, one has to assume the existence of other dispositions, which explain this change. Or, in other words, if air rarefies, it is in a different state (*modus se habendi*) than before. Since, however, the air itself remains the same, the different mode of being can only have been caused by an additional disposition; and this precisely is the air’s magnitude.

Item. Ponamus casum quod sit unus globus aeris, omnibus aliis circumscriptis, et Deus illum rarefaciat aut condenset; constat quod ibi erit mutatio; et omnis mutatio vel motus est de una dispositione in aliam; igitur oportet praeter substantiam aeris

⁴⁴ That the form of the air is not the obstacle is proven in a separate experiment, involving the heating of air in a cup (*fiola*).

⁴⁵ John Buridan, *tertia lectura*, in: Patar 2001 (*op. cit.*, above, n. 13), vol. 2, 21, l. 83-22, l. 5 with a slightly modified punctuation.

ponere alias dispositiones secundum quas erit illa mutatio. Et non potest dici quod illae dispositiones sunt loca, quia secundum dictam positionem non esset ibi aliquis locus, cum locus sit continens extrinsecum; et nos circumscribebamus omnia extrinseca.

Item. Ille aer, si rarefieret, alio modo se haberet quam ante; et tamen non esset alius aer; igitur ille modus se habendi differt ab aere, et non potest differre nisi sit dispositio addita; et illa est magnitudo quam quaerimus. Et ista ratio potest fortificari per syllogismum expositorum. . . .⁴⁶

In *quaestio* 6 of book 1 of his *Quaestiones* on the *Physics* (*utrum omnis res extensa sit quantitas*), Albert of Saxony takes on both arguments. They appear in the arguments *quod non*, that is, in the arguments against his own thesis that substance and quantity coincide. Argument six and seven which Albert lists, and which he attributes to *quidam*, clearly echo the above line of reasoning, culled from Buridan's *tertia lectura*. Argument six is a paraphrase of Buridan's experiment of the condensation and rarefaction in a pair of bellows. It repeats that neither the air's matter, nor its form, nor its quality prevents the bellows from being compressed.

Consequenter quaeritur utrum omnis res extensa sit quantitas. Arguitur quod non. . . . Sexto. *Arguunt quidam sic*: sit una vesica plena aere; tunc comprimenti illam aliquid existens in vesica resistit; sed hoc nec est materia aeris nec forma aeris nec qualitas aeris; videtur ergo quod hoc sit quantitas aeris. Tunc sic: quantitas aeris in vesica resistit comprimenti et non materia neque forma neque qualitas ipsius aeris; igitur quantitas aeris est distincta ab his, et per consequens ista non sunt quantitas; et cum ista sint extensa, sequitur non omnem rem extensam esse quantitatem. Quod autem materia aeris non resistat, patet, quia materiae aeris non repugnaret stare sub quantitate minore, ex eo quod illa non determinat sibi aliquam certam extensionem. Nec etiam forma aeris resistit, quia similiter formae aeris non repugnaret stare sub extensione minore; unde sub multo minore extensione salvaretur forma aeris. Nec etiam potest dici quod qualitas aeris sicut est caliditas, humiditas, resistat, quia illis similiter non repugnaret esse sub extensione minore.⁴⁷

Argument seven, also explicitly attributed to the same *quidam*, rephrases Buridan's argument that the rarefaction of a body with a size of one foot into a body of two feet, everything else being destroyed [by divine omnipotence], can only be explained if one assumes that something new has been added to the body. But only its size (*quantitas*) seems to have been added. Consequently, quantity is different from substance.

Septimo. *Arguunt isti ad idem*. Nam, posito quod aliquod pedale, omni extrinseco annihilato, rarefiat quod fiat bipedale, tunc, ipso sic rarefacto, ipsum habet se aliter quam

⁴⁶ John Buridan, *tertia lectura*, in: Patar 2001 (*op. cit.*, above, n. 13), vol. 2, 22, l. 6-23 l. 18.

⁴⁷ Patar 1999 (*op. cit.*, above, n. 28), vol. 2, 81, l. 44-82, l. 58, with a slightly modified punctuation.

prius se habuit; sed non per habitudinem et comparisonem eius ad aliquod extrinsecum, ex quo quodlibet sibi extrinsecum ponitur annihilatum; igitur videtur quod intrinsece se habeat aliter quam prius se habuit. Sed non posset intrinsece aliter se habere quam prius se habuit, nisi aliqua res de novo esset sibi superaddita; sed non videtur esse alia quam nova quantitas et extensor; igitur videtur quod quantitas sit una res superaddita rei extensae.⁴⁸

Albert resolves the experiment from the bellows by pointing out that it is the form of “the mass of air” (*forma existens in tanta massa materiae*)—not the air’s form absolutely taken—which resists the compression. The rarefaction of a body from one to two feet, on which the other argument hinges, is attributed to the local motion of the parts (*solum per motum localem*). In the hypothetical case that everything external to the body has been destroyed, and, consequently, the body is not in a different disposition relative to anything externally, it is still true that its parts are more distant from one another.

Ad sextam de vesica dico quod nec materia aeris resistit, nec forma abstracta, sed forma existens in tanta massa materiae. Unde bene verum est quod forma aeris posset bene esse sub minore quantitate quando non esset in tanta materiae; cum tamen est in tanta massa materiae, cum non possit stare in materia quantumcumque densa, ipsa est illud quod resistit comprimenti.

Ad aliam dico quod si aliquod corpus pedale, omni extrinseco annihilato, rarefiat quod fiat bipedale, dico quod, quamvis ad nihil extrinsecum se habeat aliter quam prius, tamen adhuc quaelibet pars eius ad aliam habet se aliter quam prius, quia magis distat ab ea quam prius distabat et non per acquisitionem alicuius rei novae, sed solum per motum localem. Ex hoc patet ad argumentum.⁴⁹

Buridan, in Book 1, q. 8 of his *ultima lectura*, seems to provide a direct response to Albert’s text. As in the *tertia lectura*, Buridan here too defends the thesis that substance and magnitude do not coincide: *nulla substantia est magnitudo*. The structure of the argument which Buridan presents in support of his thesis is rather complex. First Buridan presents a number of traditional arguments against the thesis that substance and quantity coincide. Even though these arguments support Buridan’s own view, he finds the majority of them unconvincing. In order to disclose their flaws, Buridan sets out to refute them one by one, as if he himself were a proponent of the view that substance and quantity are identical.⁵⁰

Ista quaestio est valde difficilis. Multi enim ponunt, et specialiter moderni quod omnis res extensa est magnitudo propter auctoritates prius factas et rationes, et difficile est demonstrare oppositum. Unde rationes quae in oppositum deductae sunt, ut in pluribus

⁴⁸ Patar 1999 (*op. cit.*, above, n. 28), vol. 2, 82, l. 59-83, l. 68.

⁴⁹ Patar 1999 (*op. cit.*, above, n. 28), vol. 2, 90, l. 3-91, l. 15.

⁵⁰ See also Maier 1955 (*op. cit.*, above, n. 38), 211.

sophisticae sunt. Ideo possunt faciliter evadi. Ne aliquis aliquibus illarum rationum acquiescat tamquam demonstrationibus, quod esset inconveniens, et ut illi, qui volunt istam opinionem tenere, sciant evadere illas rationes quae in contrarium sibi factae sunt, ego ac si essem de illa opinione, volo respondere ad illas rationes.⁵¹

After thus having willingly assisted his opponents by refuting thirteen arguments in support of his own view, Buridan still maintains that no substance coincides with quantity.

Non obstante tamen quod sic possunt solvi vel evadi rationes praedictae, ego pono conclusionem quod nulla substantia est magnitudo.⁵²

Only at this stage of the *quaestio*, Buridan provides the arguments which he finds really convincing. The most important proof for his own view again is the experiment with the bellows. The *ultima lectura* basically repeats the experiment from the *tertia lectura*, though in a more carefully developed version and with a more drawn-out conclusion.

Hoc declaratur supponendo quod aer manens idem secundum substantiam potest multum rarefieri et condensari per calefactionem et frigectionem. Quod experimentaliter apparet, quia, si fiola vitrea calefiat super carbones, aer interior multum rarefit in tantum quod, si os fiolae ponatur in aqua frigida culo verso superius, cum per parvam horam temporis aer interior refrigerabitur, ille in tantum condensabitur quod oportebit aquam ascendere in fiolam usque ad medium eius repletionem, ne sit vacuum, quia aer interior condensatus obtinet minorem locum in subduplo quam ante, cum esset rarior. Postea per experientiam ego suppono quod trahendo vel comprimendo aerem sine calefactione vel frigectione, tu non potes aerem in tantum, scilicet ad duplum condensare vel rarefacere, sicut dictum est, quantum tu potes per calefactionem vel frigectionem; quod patet in folliis. Nam si latera folliis sint perfecte ab invicem elevata, ut intra sit aeris plenitudo et obstruantur bene omnia foramina folliis, tu non poteris comprimere latera folliis ad subduplum, immo nec ad aliquam notabilem quantitatem; igitur per compressionem tu non potes notabiliter condensare aerem. Similiter, si latera sint non perfecte sed medio modo ab invicem elevata, et omnia foramina obstruantur, tu non poteris amplius notabiliter elevare latera folliis, ne sit dare vacuum. Hoc tamen tu posses, si posses per tractionem notabiliter rarefacere aerem sicut tu posses per calefactionem. Tunc igitur quaero, quid prohibet quod ego non possem condensare notabiliter aerem existentem inter latera folliis per compressionem laterum vel etiam notabiliter rarefacere per elevationem? Constat bene quod causa huius reddi non potest nisi ponamus dimensionem distinctam a materia et forma, a caliditate et frigiditate et huiusmodi qualitativis; quae praedicta

⁵¹ The passages of Buridan's *Quaestiones super libros Physicorum, secundum ultimam lecturam* are quoted from the forthcoming critical edition. Books I and II have been prepared by Olaf Pluta. The following two manuscripts have been used to establish the text: Copenhagen, Det kongelige Bibliotek, Ny kongelig Samling, cod. 1801 fol. (C), fol. 13rb and Kraków, Biblioteka Jagiellońska, cod. 1771 (G), fol. 10ra. A slightly different edition of Book I, q. 8 of Buridan's *ultima lectura* can be found in Patir 2001 (*op. cit.*, above, n. 13), vol. 2, 120-4.

⁵² John Buridan, *ultima lectura*, C, fol. 14ra and G, fol. 10vb.

omnia sint extensa sicut uno modo motu, quem vocamus localem, solum cum omnibus sibi inhaerentibus movetur.

Sed huiusmodi dimensionem ponendo nos possumus totum salvare. Dicimus enim quod sicut albedo dat esse album formaliter, sic magnitudo, quae est extensio, dat esse extensum et magnum. Et sicut in eodem subiecto plus de albedine dat esse albius et plus de caliditate calidius, ita plus de magnitudine maius et extensius. Ideo etiam sicut idem prius album non potest fieri albius nisi per generationem albedinis in eo cum albedine praecedente, nec fieri minus album nisi per corruptionem partis albedinis, ita idem existens magnum non potest fieri maius sine aliqua generatione magnitudinis cum magnitudine praeeistente, nec fieri minus existens magnum sine corruptione magnitudinis. Modo ultra dicimus quod in subiectis ad hoc habilibus sicut ad calefactionem consequitur naturaliter generatio levitatis et ad frigectionem corruptio levitatis et generatio gravitatis, sic etiam ad huiusmodi calefactionem sequitur naturaliter generatio partialis magnitudinis et ad frigectionem corruptio levitatis et generatio gravitatis. Et credo quod hoc sit rarefactio et condensatio. Raritas enim nihil aliud est in materialibus quam in pauca materia multa magnitudo, et densitas est in multa materia pauca magnitudo. Et dicimus ultra quod de huiusmodi magnitudine non potest aliquid ita notabile generari vel corrumpi per compressionem vel tractionem sicut per calefactionem et frigectionem, sicut nec etiam de gravitate et levitate. Et sic apparet causa et ratio praedictorum posita sic magnitudine esse distincta a substantia et qualitate.⁵³

Next, in the section that immediately follows, Buridan takes issue with other scholars (*alii*), who attribute the condensation and rarefaction “solely to the local motion of the parts [of air].”

Sed videtur mihi quod *alii* de praedictis non possunt convenienter reddere causam, cum enim dicunt quod non fiat condensatio vel rarefactio per generationem vel corruptionem magnitudinis, sed solum per motum localem partium per quem approximantur undique ad invicem vel elongantur. Et ego possum corpora movere localiter pellendo vel trahendo. Quid enim prohibet quod ego non possum comprimere simul partes aeris condensando ad obtinendum minorem locum? Materia enim non obstat, quia plus de materia posset in multo minori loco. Nec forma substantialis aeris obstat, quia illa tota forma sit in minori loco aere condensato per frigectionem, sicut dictum est. Nec caliditas obstat secundum se ipsam, licet forte obstet inquantum sequitur ad eam generatio magnitudinis, nam multo plus de caliditate posset in valde minori loco, quia in parvo ignito ferro est multo plus de caliditate. Si tu dicas quod obstat ex parte raritatis, quae a praedictis distincta est, ego concedo, quia tunc illa raritas est magnitudo vel dimensio quam ego quaero. Illi enim sicut non possunt magnitudinem distinctam a praedictis ponere, ita nec raritatem.⁵⁴

Although this view was also defended by William Ockham, it is directed, I think, against Albert of Saxony. In the *tertia lectura*, Buridan also mentioned the view that condensation and rarefaction were sometimes attributed to local motion, but only now, in the *ultima lectura*, this view is restructured as a counter-argument against his experiment with the bellows.

⁵³ John Buridan, *ultima lectura*, C, fols. 14ra-14rb, and G, fol. 10vb-11ra.

⁵⁴ John Buridan, *ultima lectura*, C, fols. 14rb-14va, and G, fol. 11ra.

Buridan concludes his argument from the bellows with an additional argument, which we already encountered in Albert of Saxony's text, namely the argument of the rarefaction of a one-foot body into two feet. The rarefaction causes the body to be in a different mode of being than before. However, since everything outside of this body has been annihilated by divine omnipotence, this different mode of being is not with respect to something external to the rarified body, but intrinsically. And these different modes of being are precisely what Buridan labels "magnitudes."

Conclusio nostra principalis potest sic persuaderi aliquibus aliis rationibus. Si enim corpus pedale et omnia corpora sibi extrinseca sint annihilata, et rarefiat per potentiam divinam donec sit bipedale, constat quod alio et alio modo se habet prius et posterius, et non ad aliquod extrinsecum, igitur intrinsece. Et istos modos ex parte rei alios ab invicem vocemus 'magnitudines,' cum nos ponamus quod non sit prius et posterius alia materia vel alia forma substantialis vel alia caliditas aut frigiditas. Et sic de aliis.⁵⁵

There is some further evidence, not previously noticed, that strongly suggests that Albert of Saxony responded to Buridan's *tertia lectura*, and was prior to Buridan's *ultima lectura*. In the *tertia lectura*, Buridan labels his own position that quantity and substance are different as the *via antiqua*, the traditional view, which harks back on Aristotle and Averroes.

Ad istam quaestionem respondeo *secundum viam antiquam* quod nulla substantia est magnitudo sive quod materia non est magnitudo.⁵⁶

Albert of Saxony, however, when he comes to speak of the position that quantity and substance are different, reports that it was held by some of his contemporaries and most thinkers from the past. Albert singles out the two arguments the "sixth" and the "seventh," which were deemed particularly important by proponents of this view.

In ista quaestione primo recitabo unam opinionem; secundo ponam conclusiones ad quaestionem, quibus patet improbatio illius opinionis. Quantum ad primum sciendum est quod est *opinio aliquorum modernorum et plurium antiquorum* quod quantitas sit una res distincta a re extensa et quanta, recte sicut albedo est res distincta a re habente albedinem. *Et isti rationem sextam et septimam multum reputant pro ista opinione.*⁵⁷

The "sixth and seventh arguments" to which Albert refers, are the sixth and seventh arguments *quod non* discussed above: the argument from the bellows, and the argument of the rarefaction by divine omnipotence, both

⁵⁵ John Buridan, *ultima lectura*, C, fol. 14va, and G, fol. 11ra.

⁵⁶ John Buridan, *tertia lectura* in Patar, *La physique de Bruges*, 21, l. 75-76.

⁵⁷ Patar 1999 (*op. cit.*, above, n. 28), vol. 2, 85, l. 14-86, l. 21 (Book 1, q. 6).

advanced by Buridan and reported by Albert. This context ties the *opinio aliorum modernorum* to the position of John Buridan.

The change of perspective between Albert's *Quaestiones* on the *Physics*, and Buridan's *tertia lectura* is interesting. Buridan perceives himself as a follower of the "ancient way," the *via antiqua*. But through the eyes of his Parisian contemporary Albert, he is one of the *moderni*. So the same doctrinal position, namely that substance and quantity are distinct, can both be labelled "antiquus" and "modernus."

In the *ultima lectura*, Buridan introduces yet another change of perspective. There, he can claim that in particular "moderns" hold the view—opposite to his own—that substance and quantity are identical. The observation is absent in the *tertia lectura*, but, then, he had not yet encountered Albert of Saxony, a *modernus*, a contemporary, who defended precisely this position and who had, moreover, challenged some of Buridan's own arguments.

Ista quaestio [scil. utrum omnis res extensive et situatiter habens partem extra partem est magnitudo] est valde difficilis. Multi enim ponunt, et *specialiter moderni* quod omnis res extensa est magnitudo propter auctoritates prius factas et rationes, et difficile est demonstrare oppositum.⁵⁸

The impetus Theory

The second case study concerns the theory of impetus which John Buridan and others developed to explain the continuation of projectile motion after the contact between mover and moved object had been dissolved. Buridan introduced the notion of "impetus" to denote an impressed force, which he conceived as a quality whose nature it is to move the body in which it is impressed. In what way does this theory teach us anything about the relation between Buridan and Albert?

In her groundbreaking study about the impetus theory, Anneliese Maier compared Albert of Saxony's discussion of the impetus theory in his *Quaestiones* on the *Physics* to Buridan's *ultima lectura*, and concluded that the former heavily depended on the latter. However, she noted one peculiar fact: Albert seemed to avoid the terminology of *impetus*, and preferred the terms *virtus motiva* or *qualitas motiva*.⁵⁹ Let us recur to the relevant texts, which had already been edited by Anneliese Maier.⁶⁰

⁵⁸ John Buridan, *ultima lectura*, C, fol. 13rb, and G, fol. 10ra.

⁵⁹ Maier 1968 (*op. cit.*, above, n. 31), 264.

⁶⁰ Maier 1968 (*op. cit.*, above, n. 31), 207-14 provides the text of Buridan's *ultima lectura*,

In book 8, q. 13 (*unde moveatur proiectum post separationem a proiciente*) Albert discusses projectile motion.⁶¹ He presents four different views as to why a projectile continues its motion after it has lost contact with a mover. The first three views which he discusses, have their origin in Aristotle's *Physics*. The fourth view, which he qualifies as the truest view (*quam pro nunc reputo veriore*), is Buridan's theory. It attributes the projectile's motion to a certain motive force, a *virtus motiva*. Six times in this *quaestio*, Albert refers to *virtus motiva*, *virtus motiva sibi impressa*, or just *talis virtus*. This *virtus motiva* is identified as a quality, which is innate to move.

Alia opinio est quam pro nunc reputo veriore. Et est quod proiciens imprimit projecto quandam virtutem motivam quae est quaedam qualitas quae innata est movere . . .⁶²

Even though Albert here adheres to Buridan's view, his terminology is in sharp contrast to the one used in the *ultima lectura*. In book 8, q. 12 which is devoted to the causes of projectile motion (*utrum proiectum post exitum a manu proicientis moveatur ab aere vel a quo moveatur*), Buridan uses the term *impetus* no less than 41 times. Only once does he use the term *virtus impressa*, and then only when he introduces the term *impetus* for the first time in his *quaestio*.

Ideo videtur mihi dicendum quod motor movendo mobile imprimit sibi *quendam impetum vel quandam virtutem motivam* illius mobilis.⁶³

Why would Albert of Saxony prefer the term *virtus motiva* over *impetus* when he expresses his adherence to Buridan's theory? Unless, of course, he was not familiar with this term, because he did not know the *ultima lectura*, as I have been arguing above. A comparison between Albert's text and Buridan's *tertia lectura* seems to settle the matter.

In the *tertia lectura*, Buridan discusses projectile motion in book 7, q. 5 (*utrum proiectum post exitum eius a manu proicientis moveatur a motore extrinseco vel a motore intrinseco sibi inhaerente*). Seventeen times, Buridan refers to *virtus motiva*, *vis motiva*, *vis impressa*, or just *illa vis*, when explaining the continuation of a projectile's motion. There, he also gives his well-known characterization of this *vis motiva* as a quality which is naturally apt to

and on pp. 260-3 Albert of Saxony's text. In the addenda, on pp. 372-5 she provides the text of Buridan's *tertia lectura*.

⁶¹ Patar 1999 (*op. cit.*, above, n. 28), vol. 3, 1070-5.

⁶² Patar 1999 (*op. cit.*, above, n. 28), vol. 3, p. 1074, l. 94-96.

⁶³ Patar 2001 (*op. cit.*, above, n. 13), vol. 2, p. 211, l. 34-36.

move the subject upon which it has been impressed. For as Buridan quotes with approval:

Dicunt aliqui: probatur quod illa vis motiva est quaedam qualitas permanentis naturae quae est innata movere subiectum suum . . .⁶⁴

It is the same definition which Albert of Saxony gave (see above). The term ‘*impetus*’ occurs only three times in the *tertia lectura*, always in connection with the term ‘*vis impressa*,’ as if Buridan were explaining an unfamiliar synonym. All three occurrences stand together in one passage.

Ex hoc etiam redditur ratio quare motus naturalis ipsius gravis continue magis et magis velocitatur. Nam a principio sola gravitas movet ipsum grave, et movendo imprimit ipsi cum motu *quendam impetum seu quendam vim motivam* in ipso gravi, et tunc movetur istud grave non solum a gravitate sed cum hoc cum illa vi; ideo velocius movetur. Et per consequens *illa vis sive ille impetus* augeatur; ideo iterum velocius movetur et sic continue motus velocitatur. Sed nunc est valde magna dubitatio: quae res est *illa vis sive ille impetus*?⁶⁵

The way in which Albert of Saxony discusses Buridan’s *impetus* theory seems to provide further evidence for the thesis that his *Quaestiones* on the *Physics* are chronologically located between Buridan’s *tertia lectura* and his *ultima lectura*.⁶⁶ When writing his *Quaestiones*, Albert had no access to the *ultima lectura*, and, in line with the *tertia lectura*, avoided the neologism “*impetus*”. He preferred the traditional terminology of *virtus motiva* which was also used in the *tertia lectura*.⁶⁷

Conclusion

The relative order of Buridan’s and Albert of Saxony’s *Quaestiones* on the *Physics*, which was based on textual and doctrinal comparisons, seems to be confirmed, or in any case, not contradicted, by the little that is known about the dates of origin of these works. Buridan’s *tertia lectura* is dated around 1350, whereas the *ultima lectura* was composed sometime

⁶⁴ John Buridan, *tertia lectura*, in Patar 2001 (*op. cit.*, above, n. 13), 63, l. 71-73.

⁶⁵ John Buridan, *tertia lectura*, in Patar 2001 (*op. cit.*, above, n. 13), 61, l. 51-52, l. 57.

⁶⁶ As indicated above, Sarnowsky 1989 (*op. cit.*, above, n. 9), 50 already suggested this order, but since he was focusing on the chronology of Albert of Saxony’s writings, he did not draw out the full implications of this revised chronology for the connection between Buridan and Albert.

⁶⁷ This is not to suggest that it was Buridan who coined the term *impetus*. The term *virtus motiva* ultimately may go back to Francis of Marchia. See Maier 1968 (*op. cit.*, above, n. 31), 166-80, for instance on l. 202-203 and l. 204. The philosophical relationship between Francis de Marchia and Buridan is briefly discussed on pp. 200-1.

between 1352 and 1357.⁶⁸ Albert of Saxony's *Quaestiones super octo libros Physicorum* are to be dated shortly after 1351. This date is suggested by one of its copies, whose introductory remarks tie the text to Albert's opening lecture (*principium*) on Aristotle's *Physics*.⁶⁹ Since Albert of Saxony incepted in the summer of 1351, it seems that the *Quaestiones* on the *Physics* was the first work that he read at Paris after the completion of his studies there.

Further study of passages from Buridan's and Albert's *Quaestiones* that reveal significant doctrinal disagreements may corroborate the proposed chronology.⁷⁰ At the same time, they may help solve new questions about the production of scholastic works, and about the impact that Albert of Saxony may have had on Buridan's *ultima lectura* (rather than the reverse). Although Buridan must have been teaching the *Physics* since the late 1330s, he wrote his commentaries much later in life. Albert of Saxony, on the other hand, wrote his commentary right after having completed his degree. Why did Buridan feel it necessary to revise his *tertia lectura*, and write a new commentary? Is the introductory remark that the work is written at the request of his students merely a commonplace; and if not, what about the previous generations of his students who had to do without his written commentary?⁷¹ Did the appearance of Albert's commentary play a pivotal role in shaping the *ultima lectura*? Was it, for

⁶⁸ The evidence concerning the dates of composition was already known to Edmond Faral and Anneliese Maier. See Michael 1985 (*op. cit.*, above, n. 1), vol. 2, 606-8.

⁶⁹ It is the manuscript Erfurt, Wissenschaftliche Allgemeinbibliothek, F. 345, which was written in 1360 in Cologne. Its *incipit* reads as follows: "Quoniam dicit Philosophus 'a communibus et prioribus prius est inchoandum', ideo propter informationem inbuicionemque iuvenum scolarium in isto primo libro *tanquam pro principio meo volo istam questionem disputare: Utrum scientia . . .*" See Sarnowsky 1989 (*op. cit.*, above, n. 9), 18-9, and 49.

⁷⁰ One such further topic that can be fruitfully explored is the discussion of place (*locus*) in book 4, suggested by Sarnowsky 1989 (*op. cit.*, above, n. 9), 51, n. 199, and further developed in his 'Si extra mundum fieret aliquod corpus . . .' *Extrakosmische Phänomene und die Raumvorstellungen der 'Pariser Schule' des 14. Jahrhunderts*, in: Jan A. Aertsen and Andreas Speer (eds), *Raum und Raumvorstellungen im Mittelalter*, Berlin-New York 1997, 131-44. Different approaches between Buridan and Albert with respect to reasoning from God's absolute power are indicated in Jürgen Sarnowsky, *God's Absolute Power, Thought Experiments, and the Concept of Nature in the 'New Physics' of XIVth-Century Paris*, in: Stefano Caroti and Pierre Souffrin (eds), *La nouvelle physique du XIV^e siècle*, Florence 1997, 179-201.

⁷¹ Although it is generally acknowledged that *Expositio* and *Quaestiones* are linked to teaching practices at the arts faculty, much is still unclear concerning the precise relation between the production of such works and actual teaching. A first start of studying the relationship between oral lecture and written text has been made by Christoph Flüeler, *From Oral Lecture to Written Commentaries: John Buridan's Commentaries on Aristotle's Metaphysics*, in: Sten Ebbesen & Russell L. Friedman (eds), *Medieval Analyses in Language and Cognition*, Copenhagen 1999, 497-521.

instance, under the influence of Albert's *Quaestiones* that Buridan expanded the *ultima lectura* in comparison to his previous *tertia lectura*, and that he moved the discussion of projectile motion from book 7 to book 8?⁷² Recent work on the logic of John Buridan and Albert of Saxony shows a pattern similar to the one brought to attention here: it is Buridan who responds to Albert of Saxony, rather than the reverse.⁷³

Although all I have covered here are a few passages from Buridan's and Albert's *Quaestiones* on the *Physics*, the main drift of this article is that the common notion of a Buridan school needs to be qualified. I hope that the reader has come to share my thought that future studies in this area would benefit from a greater readiness to perceive John Buridan, Albert of Saxony, Nicole Oresme, Themon Judeus, and Marsilius of Inghen as a small intellectual network of nearly contemporary masters of arts, who were familiar with each other's work and at times responded to one another. This concept seems more adequate than that of a unified Buridan school in explaining the dynamics of conflict and alliance that we encounter in the texts.⁷⁴

Nijmegen

Philosophisch Instituut

⁷² Aristotle's *Physics* book 8, esp. 266 b 27-267 a 5 is the most logical context to discuss projectile motion. However, the problem can also be raised in connection with *Physics*, book 7, esp. 241 b 24, where Aristotle discusses the motion of things that do not have the source of motion in themselves, and the axiom that everything that is in motion must be moved by something (*omne quod movetur . . .*).

⁷³ Christoph Kann, *Die Eigenschaften der Termini. Eine Untersuchung zur Perutilis logica Alberts von Sachsen*, Leiden-New York-Köln 1994, 14-8 has convincingly argued, contrary to the received view, that Albert of Saxony's *Perutilis logica* is prior to Buridan's *Summa logicae* (that is, a treatise that contains Buridan's *Summulae de Dialectica* plus his commentary). See also Fitzgerald 2002 (*op. cit.*, above, n. 7), esp. 5-30 for other examples derived from Buridan's works on logic.

⁷⁴ It also better fits the latest evidence, unraveled by Stefano Caroti and published in this fascicle, that Albert of Saxony took into account Oresme's *Quaestiones* on the *Physics* as well. See Stefano Caroti, *Some Remarks on Buridan's Discussion on Intention and Remission*, in this fascicle. See further the forthcoming article by Jürgen Sarnowsky, which also points at a dependency of Albert of Saxony on Nicholas Oresme: *Nicole Oresme and Albert of Saxony's Commentary on the Physics: The Problems of Vacuum and Motion in the Void*, in: Stefano Caroti and Jean Celeyrette (eds), "*Quia inter doctores est magna dissensio . . .*", Florence 2004, 161-74. Yet another illustration of this alternative view is Themon Judeus' commentary on Aristotle's *Metheora*. In it, he attacks Albert of Saxony. Nicole Oresme in his turn, seems to have copied long passages from Themon's commentary. See Sarnowsky 1989 (*op. cit.*, above, n. 9), esp. p. 41 n. 150, and p. 52, and the literature cited there.